NHSN Healthcare Associated Infection Surveillance
What has Changed in 2015?

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NHSN Training 2015

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National Center for Emerging and Zoonotic Infectious Diseases

Division of Healthcare Quality Promotion

Agenda

- Purposes of 2015 changes
- New definitions and modifications
- Major changes to specific infection definitions (a.k.a. Chapter 17)
- Temperature
- Denominator Sampling
- Questions

Case studies included

Purposes of 2015 Definitional Modifications

- Improve patient care*
- Decrease subjectivity*
- Optimize data consistency*
- Reflect current diagnostic methods*
- Respond to user input*

**While avoiding additional surveillance burden*

New Definitions and Modifications

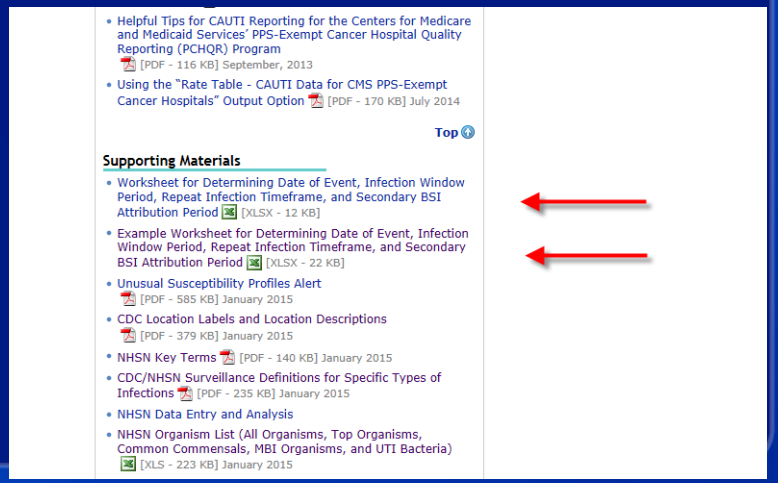
- **Infection Window Period*†**
- **Date of Event***
  - Present on Admission (POA) Infections*†
  - Healthcare-Associated Infections (HAI)*†
- **Repeat Infection Timeframe (RIT)*†**
- **Secondary BSI Attribution Period*†**
- **Pathogen assignment (as relates to RIT) *†**

*Does not apply to VAE, LabID Event Surveillance
†Does not apply to SSI Surveillance

Worksheet for Surveillance

- *To promote consistent surveillance data collection*
- *Worksheet, and example of a completed worksheet with explanation*
- *http://www.cdc.gov/nhsn/acute-care-hospital/clabsi/index.html*
- *First 2 documents under "Supporting Materials"*
- *Note: 2 tabs at the bottom of each*
- *Highly recommend use*

Potentially: CAUTI and CLABSI calculators



Worksheet for Surveillance

Date	First diagnostic test or sign/sympto	Infection Window Period	Event (Date of Event)	RIT (Specimen & Pathogen)	2ndary BSI Attribution Period	Calendar Date / Hospital Day	First diagnostic test or sign/sympto	Infection Window Period	Date of Event	Repeat Infection Timeframe - RIT	Secondary BSI Attribution Period	Cake ID
1						1						
2						2						
3						3						
4						4						
5						5						
6						6						
7						7						
8						8						
9						9						

Definition Application

	SSI	LabID	VAE
Infection Window Period	NA	Not Applicable	Not Applicable
Date of Event	Yes		
POA	NA		
HAI	NA		
Repeat Infection Time Period	NA		
Secondary BSI Attribution Period	*		

**See SSI specific guidance; N/A=Not Applicable*

http://www.cdc.gov/nhsn/PDFs/pscManual/2PSC_IdentifyingHAIs_NHSNcurrent.pdf, page 2 1

What is no longer used beginning 2015?

- Gap Days concept to determine criterion met
- Logical pathogens to determine secondary bloodstream infections (BSI)
- Date of event = Date of last element

Infection Window Period

2014		2015
Gap Day concept		Infection Window Period

Infection Window Period

- **A 7-day-period during which all site-specific infection criterion must be met. It includes the date of the first positive diagnostic test, that is an element of the site-specific criterion, 3 calendar days before and 3 calendar days after**
  - For site-specific criterion that do not include a diagnostic test, the first documented **localized** sign or symptom that is an element of the infection criterion will be used

Infection Window Period

- **Diagnostic test examples***
  - Laboratory specimen collection
  - Imaging test
  - Procedure or exam
  - Physician diagnosis
  - Initiation of treatment

- **Localized sign or symptom examples:**
  - Diarrhea
  - Site specific pain
  - Purulent exudate

* If there is more than one diagnostic test results, the most **localizing** test result will be used, e.g., if trying to determine MBI-LCBI, use the blood culture as opposed to the ANC level

Date of Event

2014		2015
Last element		First element

Date of Event

The date the first element used to meet the CDC NHSN site-specific infection criterion occurs for the first time within the seven-day infection window period

Note: The element MAY have been present before the infection window period.

Infection Window Period

Hospital Day	Criterion
8	
9	
10	
	Temp = 101.5° F
	Temp = 102.1° F
13	Urine culture: >100,000 cfu/ml, *E. coli*
14	
15	
16	
17	

Diagnostic Test

3 Before

3 After

7 Day Infection Window Period

Infection Window Period and Date of Event

Hospital Day	SUTI Criterion
8	
9	
10	
11	**Temp = 101.5° F**
12	**Temp = 102.1° F**
13	**Urine culture: >100,000 cfu/ml, *E. coli***
14	
15	
16	
17	

Date of event

7 Day Infection Window Period

Infection Window Period and Date of Event

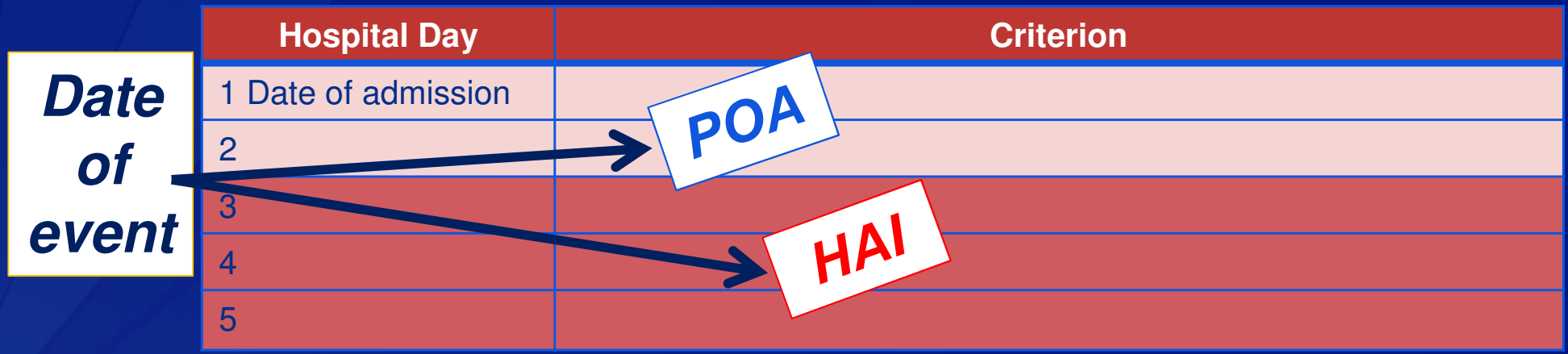
Hospital Day	SUTI Criterion
8	
9	**Temp = 100.5° F**
10	**Temp = 100.7° F**
11	
12	**Temp = 102.1° F**
13	**Urine culture: >100,000 cfu/ml, *E. coli***
14	
15	
16	
17	

Date of event

7 Day Infection Window Period

Present on Admission (POA) vs. Healthcare-Associated Infection (HAI)

- **Present on Admission - date of event* occurs on the day of admission or the day after admission to an inpatient location.**
  - The POA time period continues to include the day of admission, 2 days before and the day after admission.
- **Healthcare-Associated Infection - the date of event* occurs on or after the 3rd calendar day of admission.**



Date of event date the first element used to meet the CDC/NHSN site specific infection criterion occurs for the first time within the seven day infection window period

Date of Admission

- Date of admission = date that the patient is physically admitted to an inpatient location.

Determining New vs. Extending Infections

2014		2015
Continuation of symptoms or treatment at time of next infection • Subjective • Undocumented treatment target		Repeat Infection Timeframe • Objective • Requires no interpretation of treatment purposes • Reduces labor of surveillance

Repeat Infection Timeframe (RIT)

- **Uses date of event to determine a 14-day timeframe during which no new infections of the same type are reported**
- **The date of event is Day 1 of the 14-day Repeat Infection Timeframe**
- **If date of event for subsequent potential infection is within 14 days**
  - Do not report new event
  - Additional pathogens identified are added to the original event

Date of event

14 Day Repeat Infection Timeframe (RIT)

Hospital Day	SUTI Criterion
8	
9	
10	
11	**Temp = 101.5 ° F**
12	**Temp = 102.1 ° F**
13	**Urine culture: >100,000 cfu/ml, *E. coli***
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	

Repeat Infection Timeframe (RIT)

- **The RIT will apply at the level of specific type of infection with the exception of Bloodstream Infection (BSI), Urinary Tract Infection (UTI) and Pneumonia (PNEU) where the RIT will apply at the major type of infection**

  - Patient will have no more than one BRST (specific type of major type SST)

    As opposed to:

  - Patient will have no more than one BSI (e.g., LCBI1, LCBI2, MBI-LCBI1etc.)
  - Patient will have no more than one UTI (e.g., SUTI, ABUTI)
  - Patient will have no more than one PNEU (e.g., PNU1, PNU2, PNU3)

Major Type	Specific Type
Skin and Soft Tissue Infection	
	BRST
	BURN
	CIRC
	DECU
	SKIN
	ST
	UMB
UTI	
	SUTI
	ABUTI

OR

Repeat Infection Timeframe

14 day duration:

- **No studies available to base on, but**
  - Discussed in great detail
  - Agrees with routine BSI treatment

Having concrete timeframe:

- **Potentially decreases subjectivity**
- **Potentially increases consistency**

Knowledge Test

- Your facility is performing CAUTI surveillance on your medical ward 5-West.
- Patient admitted to 5-West on 1/15/2015 with urine culture positive for > 100,000 CFU/ml of *E. coli.* No NHSN UTI symptoms present. Foley inserted at time of urine culture.
- 9 days later (1/23/15), Foley remains, and patient has temperature of 38.2℃ and positive urine culture of > 100,000 CFU/ml of *E. coli.*

A CAUTI should be reported for this patient for 1/23/15?

A. True

B. False

Because this patient did not meet UTI criteria related to the 1/15 urine culture, no UTI repeat infection timeframe was set. Patient met criteria for CAUTI on 1/23 which will be reported.

Secondary Bloodstream Infection (BSI) Attribution

2014		2015
No objective time period for associating BSI to another infection		Secondary BSI Attribution Period

Secondary Bloodstream Infection (BSI) Attribution Period

- The period in which a positive blood culture must be collected to be considered as a secondary bloodstream infection to a primary site infection.
- This period includes the Infection Window Period combined with the Repeat Infection Timeframe (RIT)
- This period is 14 – 17 days in length depending on the date of event

NOTE: A primary BSI will not have a Secondary BSI Attribution Period

Date of event

Hospital Day	SUTI Criterion
9	
10	Temp = 101.5° F
11	
12	Temp = 102.1° F
13	Urine culture: >100,000 cfu/ml, *E. coli*
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	

14 days

Secondary BSI Attribution Period=

Infection Window Period

+

Repeat Infection Timeframe

Date of event

Secondary BSI Attribution Period=

Infection Window Period

+

Repeat Infection Timeframe

17 days

Hospital Day	SUTI Criterion
9	
10	
11	
12	
13	**Urine culture: >100,000 cfu/ml, *E. coli*; costovertebral angle pain**
14	**Temp = 101.5° F**
15	
16	
17	
18	
19	
20	
21	
22	
23	
24-26	

Secondary Bloodstream Infection (BSI) Rules

- **Secondary bloodstream infections may be attributed to a primary site infection during the Secondary BSI Attribution Period as per the Secondary BSI Guide (Appendix 1) of the BSI event protocol**

  - Blood culture pathogen matches at least one organism found in the site-specific infection culture used to meet the primary site infection criterion

  OR

  - The positive blood culture is an element used to meet the primary site infection criterion

Only two ways

Secondary Bloodstream Infection (BSI) Attribution

2014		2015
Allowed “Logical” Pathogens		Requires Matching Pathogen or Blood Culture as Element

Secondary BSI Attribution Period

Infection Window Period

+

Repeat Infection Timeframe

15 days

Day	SUTI Criterion
9	
10	
11	Temp = 101.5° F
12	Temp = 102.1° F
13	Urine culture: >100,000 cfu/ml, *E. coli*
14	
15	
16	
17	
18	Blood culture: *E.coli*
19	
20	
21	
22	
23	
24	

SUTI with secondary BSI*
Pathogen: E.coli
Date of Event: Day 11

* Per the Secondary Bloodstream Infection Guide (Appendix 1) of the Bloodstream Infection Protocol

Disposition of Pathogens Identified

- During RIT
- During Secondary BSI Attribution Period

Pathogen Assignment

- **Additional eligible pathogens identified within a Repeat Infection Timeframe are added to the event**

- **Pathogen exclusions for specific infection definitions (e.g., UTI, PNEU)* also apply to secondary bloodstream infection pathogen assignment**
  - Excluded pathogens must be attributed to another primary site-specific infection as either a secondary BSI or identified as a primary BSI

* Refer to the Urinary Tract Infection (Catheter Associated Urinary Tract Infection [CAUTI] and non Catheter Associated Urinary Tract Infection [UTI]) and Other Urinary System Infection (USI) Events and the Pneumonia (Ventilator Associated [VAP] and non ventilator associated Pneumonia [PNEU]) Events protocols

Case for consideration*

January 1: 45-year-old patient with Guillain-Barre admitted to MICU.

January 11: Temp – 101.5° F

January 12: Temp – 102.1° F

January 13: Urine culture collected; "+" 100,000 CFU/ml *E. coli.*

January 14: Blood culture collected; "+" *E. coli* and *C. albicans*

January 18: Urine culture collected;

"+" 100,000 CFU/ml *Enterococcus*

*your facility is reporting ALL healthcare-associated infections to NHSN

SUTI

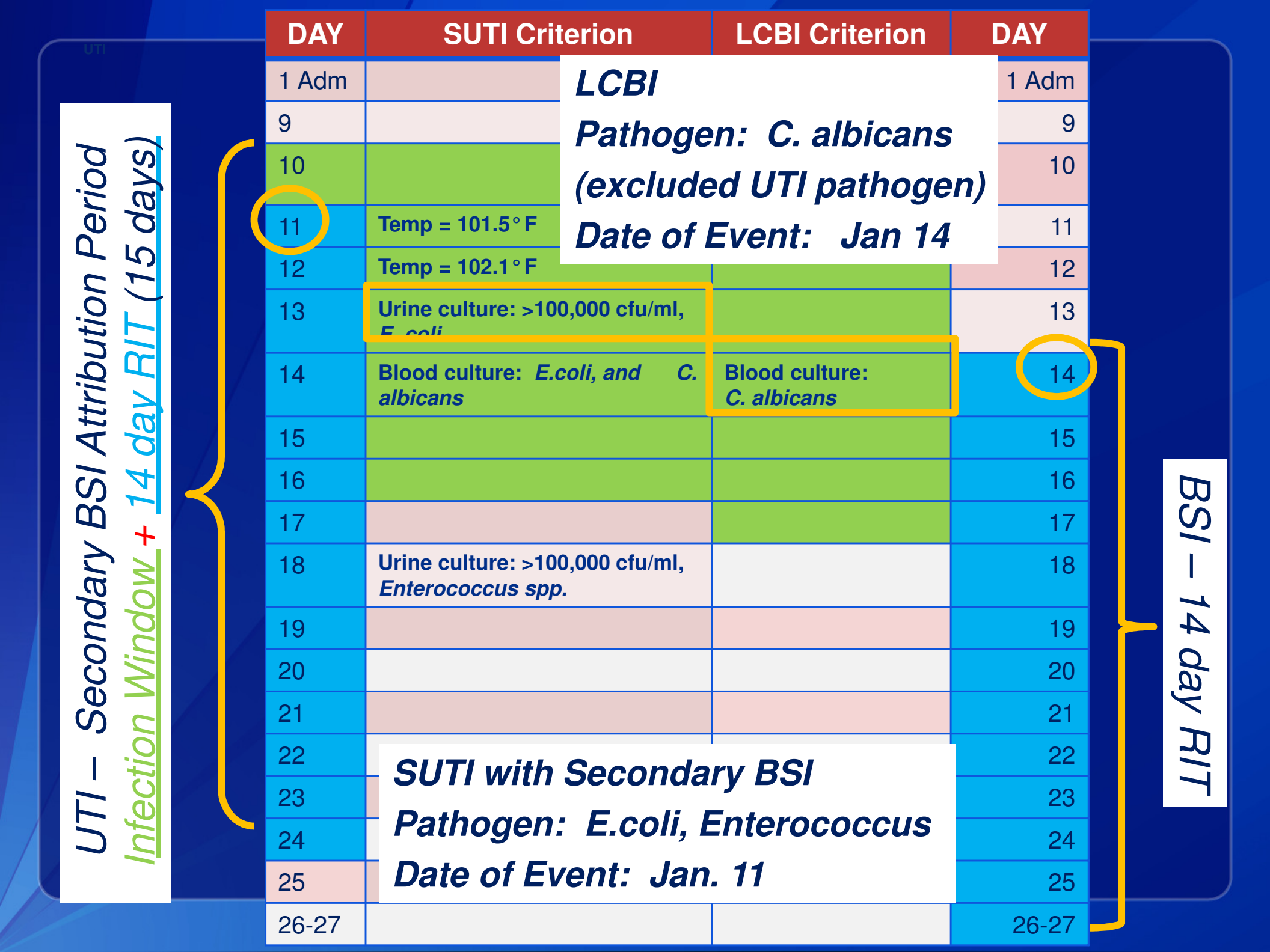
LCBI

DAY	SUTI Criterion	LCBI Criterion	DAY
1 Adm			1
2			2
3			3
4			4
5			5
6			6
7			7
8			8
9			9
10			10
11			11
12			12
13			13
14			14
15			15
16			16
17			17
18			18
19			19

Which of the following is true for NHSN reporting?

A. Patient has only an LCBI on January 14 with *E. coli* and *C. albicans*

B. Patient has a SUTI 1a on January 11 with *E. coli* and *Enterococcus and* a secondary BSI AND an LCBI with *C. albicans* on January 14.


DAY
SUTI Criterion
LCBI Criterion
DAY
1 Adm
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26-27
Temp = 101.5° F
Temp = 102.1° F
Urine culture: >100,000 cfu/ml,
Blood culture: E.coli, and C. albicans
Blood culture: C. albicans
Urine culture: >100,000 cfu/ml, Enterococcus spp.
LCBI
Pathogen: C. albicans
(excluded UTI pathogen)
Date of Event: Jan 14
SUTI with Secondary BSI
Pathogen: E.coli, Enterococcus
Date of Event: Jan. 11
UTI – Secondary BSI Attribution Period
Infection Window + 14 day RIT (15 days)
BSI – 14 day RIT

What if….

January 1: 45 year old patient with Guillain-Barre admitted to MICU.

January 11: Temp- 101.5° F

January 12: Temp- 102.1° F

January 13: ~~Urine culture collected; "+" 100,000 CFU/ml *E. coli*~~.
Blood culture collected; "+" *E.coli* and *C. albicans*

January 14: ~~Blood culture collected; "+" *E. coli* and *C. albicans*~~
Urine culture collected; "+" 100,000 CFU *E.coli*

January 18: Urine culture collected;

"+" 100,000 CFU/ml *Enterococcus*

DAY	SUTI Criterion	LCBI Criterion	DAY
1 Adm			1
2			2
3			3
4			4
5			5
6			6
7			7
8			8
9			9
10			10
11			11
12			12
13			13
14			14
15			15
16			16
17			17
18			18
19			19

Does this change what should be reported to NHSN?

A. No.

B. Yes.

The change in determination is minimal. The positive blood culture still occurs within the secondary BSI attribution period of the SUTI but the date of the primary BSI changes from Jan. 14 to Jan. 13.

DAY	SUTI Criterion	LCBI Criterion	DAY
1 Adm			1 Adm
9			9
10			10
11	Temp = 101.5° F		11
12	Temp = 102.1° F		12
13	Blood culture: *E.coli, and C. albicans*	Blood culture: *C. albicans*	13
14	Urine culture: >100,000 cfu/ml, *E. coli*		14
15			15
16			16
17			17
18	Urine culture: >100,000 cfu/ml, *Enterococcus spp.*		18
19			19
20			20
21			21
22			22
23			23
24			24
25			25
26			26

LCBI

Pathogen: C. albicans (excluded UTI pathogen)

Date of Event: Jan 13

SUTI with Secondary BSI

Pathogen: E.coli, Enterococcus

Date of Event: Jan. 11

UTI – Secondary BSI Attribution Period

Infection Window + 14 day RIT (14 days)

BSI – 14 day RIT

Pathogen Assignment

- **A BSI pathogen may be reported for more than one infection source**
- **Example 1**
  - Assigned as a secondary BSI pathogen to different primary site infections (e.g., UTI and IAB)

DAY	SUTI Criterion	IAB Criterion	DAY
8			8
9		Temp = 101.5 Abdominal pain	9
10			10
11	Temp = 101.5° F	CT guided drainage of abdominal fluid collection: *E.coli*	11
12	Temp = 102.1° F		12
13	Urine culture: >100,000 cfu/ml, *E. coli*		13
14			14
15			15
16			16
17	Blood culture: *E.coli*	Blood culture: *E.coli*	17
18			18
			19
			20
			21
			22
			23
24			24

Pathogen Assignment

- **BSI pathogens may be assigned to more than one infection source**
- **Example 2**
  - Assigned as a secondary BSI pathogen to a site-specific infection (e.g., UTI) and assigned as an additional pathogen to a primary BSI event

UTI – Secondary BSI Attribution Period

Infection Window + 14 day RIT

BSI – 14 day RIT

DAY	SUTI Criterion	LCBI Criterion	DAY
8			8
9		Blood culture: *Staph aureus*	9
10			
11	Temp = 101.5 °F		
12	Temp = 102.1 °F		
13	Urine culture: >100,000 cfu/ml, *E. coli*		
14			14
15			15
16			16
17	Blood culture: *E.coli*	Blood culture: *E.coli*	17
18			18
19			19
20			20
21			21
22			22
23			23
24			24

LCBI

Pathogen: Staph aureus & E.coli

Date of Event: day 9

SUTI with Secondary BSI

Pathogen: E.coli

Date of Event: day 11

Major Definitional Changes for Specific Types of Infections

- **BSI, PNEU, SSI, UTI, VAE-**
  - Removed from chapter 17
  - Found in separate, dedicated chapters
  - Chapters cover both device-associated and non-device associated
- **BRON-**
  - Removed entirely from NHSN surveillance
- **UTI-**
  - Major changes to definitions-covered in UTI presentation
- **Secondary BSI Attribution**
  - Reviewed earlier
  - Reinforced in CLABSI presentation
- ***Clostridium difficile* infection**

Removal of BRON

- Definition non-specific and applied inconsistently
- Difficult to differentiate from other conditions
- Inappropriately used to attribute BSI as secondary when VAP, VAE or PNEU not met

Clostridium difficile Infection (CDI)

- **Purpose: minimize subjectivity, increase consistency**
- **Different criteria than LabID Event**
- **Requirements**
  - Positive test for toxin-producing *C. difficile*
  - Unformed stool or
  - pseudomembranous colitis
- **No exclusions for medications/tests or prior diarrhea**
- **Not intended to drive clinical practice**

Temperature

- No longer require core temperatures
- Use documented temperature for surveillance
- Do not convert based on site

Device-associated Denominator Sampling

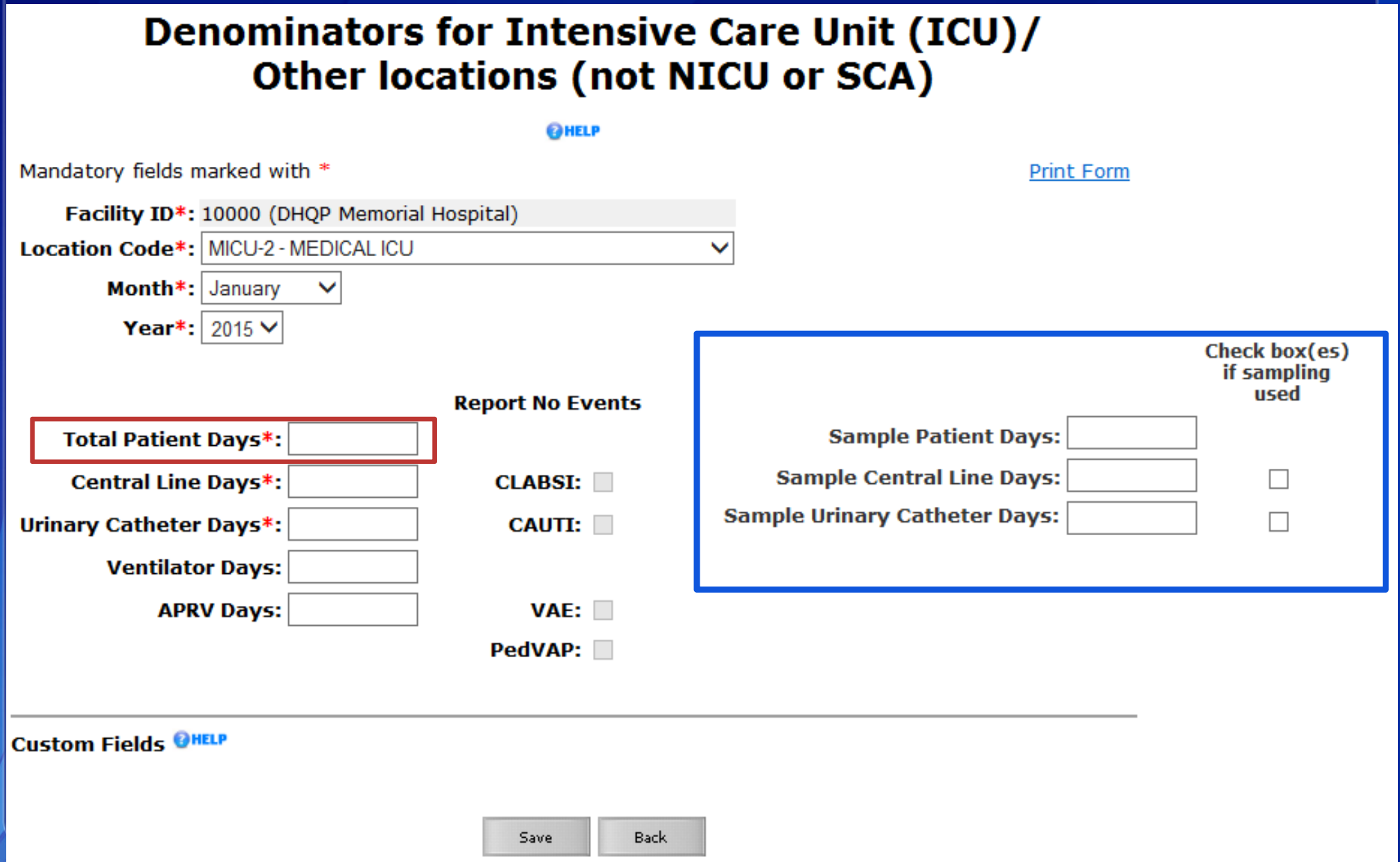
Denominator Sampling

- **Beginning in January 2015, hospitals can begin to use an alternative method for collecting CLABSI and CAUTI denominator data in eligible ICU and Ward location types**
  - Reduces staff time spent on manual collection of denominator data
  - Requires collection on the number of patient days, central line days, or urinary catheter days on a single day once per week (for example, every Tuesday)
  - Requires the number of patient days for every day of a month

Denominator Sampling

- Upon entry of the monthly data into NHSN, an estimate of central-line days or urinary-catheter days will automatically be calculated and used as CLABSI and CAUTI denominator data.

Denominator Sampling



Denominators for Intensive Care Unit (ICU)/ Other locations (not NICU or SCA)

HELP

Mandatory fields marked with *

Print Form

Facility ID*: 10000 (DHQP Memorial Hospital)

Location Code*: MICU-2 - MEDICAL ICU

Month*: January

Year*: 2015

Total Patient Days*:

Central Line Days*:

Urinary Catheter Days*:

Ventilator Days:

APRV Days:

Report No Events

CLABSI:

CAUTI:

VAE:

PedVAP:

Check box(es) if sampling used

Sample Patient Days:

Sample Central Line Days:

Sample Urinary Catheter Days:

Custom Fields HELP

Save Back

Denominator Sampling

- To ensure the accuracy of the estimated denominator data, only non-oncology ICU and ward location types with 75 or more device-days per month are eligible to use the alternative method.
- Review of each location's prior year (i.e., 12 months) of CLABSI or CAUTI denominator data in NHSN will help determine which locations are eligible.

Denominator Sampling

- The traditional method (using every day of a month) for CLABSI and CAUTI denominators remains available for all NHSN users.
- The alternative method of data collection was tested rigorously[1-3] in a variety of NHSN locations - we sincerely thank the participating facilities for their efforts to help facilitate this change.
- More detailed instructions on use of the alternative method will be included in the 2015 NHSN Manual.

1: Klevens M et al. Sampling for collection of central line day denominators in surveillance for healthcare-associated bloodstream infections. ICHE 2006;27:338-42.

2: Thompson ND et al. Evaluating the Accuracy of Sampling to Estimate Central Line–Days: Simplification of NHSN Surveillance Methods. ICHE 2013;34(3):221-228

3: See, I et al. IDWeek 2012 (Abstract #1284): Evaluation of Sampling Denominator Data to Estimate Urinary Catheter- and Ventilator-Days for the NHSN. San Diego, California. October 19th, 2012

Resources

- **NHSN Website:**

www.cdc.gov/nhsn

- **Analysis Quick Reference Guides:**

http://www.cdc.gov/nhsn/PS-Analysis-resources/reference-guides.htm

- **Identifying HAIs (Hot Topic webinar):**

https://www.youtube.com/watch?v=VH63CU3iUHw&feature=youtu.be

- **HAI worksheet (under Supporting Materials):**

http://www.cdc.gov/nhsn/acute-care-hospital/clabsi/index.html *or*
http://www.cdc.gov/nhsn/acute-care-hospital/cauti/index.html

Summary- 2015

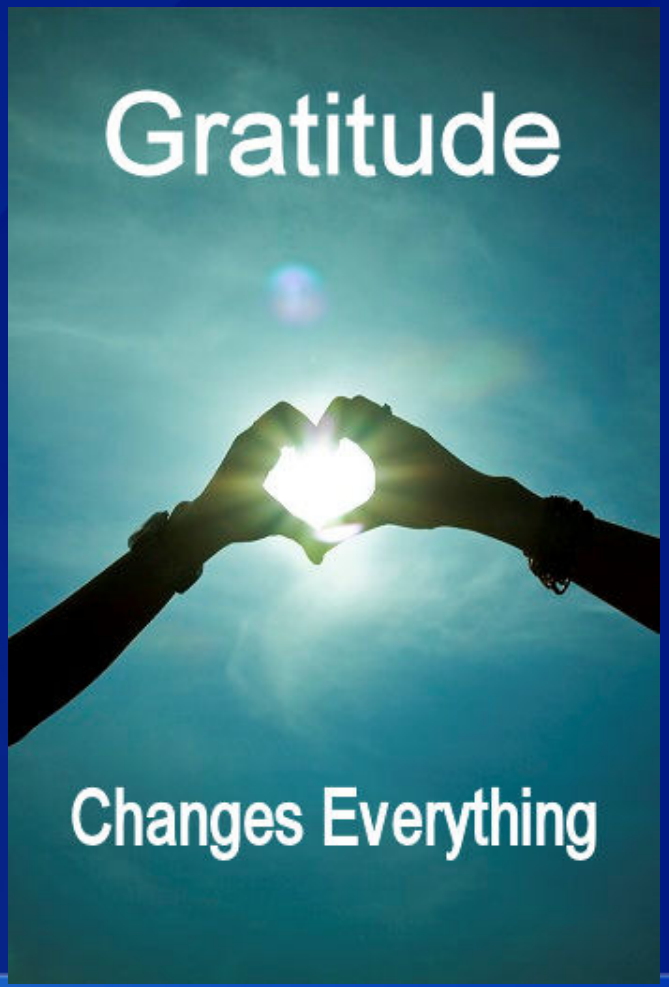
- **Gap Day concept no longer used to determine HAI- instead use the 7-day infection window period**
- **Date of event- date of first element during infection window period**
- **POA vs HAI definition unchanged**
- **Secondary BSI attribution period**
  - Time-limited (14-17 days)
- **Secondary BSI Rules**
  - Simplified – blood culture matching site or part of infection definition

Summary- 2015

- **Pathogen assignment-**
  - Add on if in RIT and not an excluded organism
  - Organism may be added to more than 1 event
- **Surveillance definitions for specific infection types**
  - BRON is no longer an NHSN infection
  - New CDI infection
  - Other important changes
- **Temperatures as documented used for surveillance**
- **New alternative device day count option- weekly sampling**
  - Available in certain location types and must have minimal average device days count ≥75 /month in prior year

In Appreciation

Thanks to Cindy Gross, Infection Preventionist, for Hot Topic slides preparation.



Questions?

Questions: email user support
nhsn@cdc.gov

NHSN Website:
http://www.cdc.gov/nhsn/